

REMARKS

Re-examination and reconsideration of the subject matter identified in caption, pursuant to and consistent with 37 C.F.R. §1.112, and in light of the remarks which follow, are respectfully requested.

Claims 23-34 remain pending in this application.

Applicant again acknowledges that claims 23-28 stand allowed.

Claims 29-32 were rejected under 35 U.S.C. §102(e) as anticipated by newly cited U.S. Patent No. 6,533,008 to Lickes et al. for the reasons given in paragraph (3) of the Office Action. Reconsideration and withdrawal of this rejection are respectfully requested for at least the reasons which follow.

The application which matured into the Lickes et al. '008 Patent was filed in the United States on July 25, 2000, and claimed the benefit of Provisional Application No. 60/149,260, filed August 17, 1999. The present application, under the provisions of 35 U.S.C. §119, claims the benefit of French Priority Application No. 99/01766, filed February 11, 1999.

Attached to this Response is a certified English translation of the French application. A review of the translation clearly shows that the disclosure of the priority application provides full support for the rejected claims. Accordingly, the present application has an effective filing date of February 11, 1999, which is prior to the earliest effective filing date of the Lickes et al. '008 Patent.

For at least the aforementioned reason, the §102(e) rejection over Lickes et al. '008 should be withdrawn. Such action is earnestly requested.

The remaining §103(a) rejections of claims 33 and 34 are each based on Lickes et al. '008 as the primary reference. Since the '008 patent is unavailable as a

reference for the reason enunciated above, the §103(a) rejections likewise should be withdrawn.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at (703) 838-6683 at her earliest convenience.

Respectfully submitted,

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Date: August 17, 2004

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CERTIFICATION

This is to certify that the attached English language document
French patent document, National Registration No. 99 01766, "Improvement of the Lifetime of Tires with
Radial Carcass by Use of Specific, Cohesive Compositions Having Low Hysteresis ;

is a true, accurate, and complete translation of an original French language document to the
best of our knowledge and belief.

Executed this 9th day
of August, 2004


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AUG 16 2004

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PATENT OF INVENTION

UTILITY CERTIFICATE · CERTIFICATE OF ADDITION

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The Director-General of the National Institute of
Industrial Property certifies that the attached document
conforms to an Application for Title to Industrial Property
filed at the Institute

Paris, January 26, 2000

for the Director of the National
Institute of Industrial Property
Head of Patent Department

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REQUEST FOR ISSUANCE

Confirmation of Filing by Facsimile ☐

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1. Name and address of Applicant or Agent
 to whom correspondence should be
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2. Nature of application

x Patent of invention

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Search Report x Immediate

The applicant, physical person, requires tiered payment
 of fees.

Title of the invention (max. 200 characters):

IMPROVEMENT OF THE LIFETIME OF TIRES WITH RADIAL
 CARCASS BY USE OF SPECIFIC, COHESIVE COMPOSITIONS
 HAVING LOW HYSTERESIS

3. APPLICANT

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x (No) If response is no, provide a
 separate designation.

(5) REDUCTION OF RATE OF FEES

(6) DECLARATION OF PRIORITY [none]

(7) DIVISIONS

(8) Signature of Applicant or Agent

For MFPM - Agent 422-5/S.020

[Signature] Robert HIEBEL

Signature on Reception

Signature After Registration of the
 Application at INPI

[Left margin: Law No. 78-17 of January 6, 1978 relative to computer files and to liberties apply to responses made on this form. It guarantees a right of access and of [illegible word] for the data regarding you at INPI.]

The present invention relates to the use of rubber compositions intended for the manufacture of pneumatic tire casings, as elastomeric compositions with internal filling, also termed cushion mixtures, mainly in the shoulder zone and the low zone of the tire.

Pneumatic tires with radial carcass for motor vehicles carrying heavy loads at more or less high speeds, particularly those for heavy vehicles, have a skeleton constituted by reinforcements or by plies of metallic wires embedded in elastomer, namely in a low zone one or more bead cores, a carcass sheath extending from one bead core to the other and to the apex, an apex sheath comprising two or more apex sheets. This skeleton is consolidated by elastomeric compositions. Among radial carcass tires, those intended to equip vehicles carrying heavy loads at more or less high speeds, in particular for heavy vehicles, are designed to be able to be retreaded several times when the tread in contact with the ground is worn out, implying the availability of retreadable carcasses which have not suffered any considerable damage after wear of one or more treads.

However, it happens that tire life may be shortened by the appearance of damage in an internal filling rubber profile, for example a breakage, which can then propagate to the internal or external surface of the tire, bringing about the rejection of the envelope. As an example of damage there can be cited a triangular-shaped break in the rubber profile in the region of the tire shoulder, separating the carcass ply from the radially interior apex sheet; the breakage results from an imposed deformation stress, such as a shock against a sidewalk or a shock against the edge of a traffic circle disposed in a crossroads. In fact, some traffic circles are too narrow for a vehicle assembly with trailer to pass without mounting the edge, the profile of which is often aggressive.

It is desirable that the cohesion of the rubber mixtures for internal filling is as high as possible, to avoid or reduce these starting-points of damage.

It is known to one skilled in the art that elastomeric compositions for internal filling undergo deformations at each turn of the wheel, giving rise to a high heating which is deleterious to the lifetime of the said compositions. In fact, at operating temperatures which are often greater than 100°C, the mechanical properties and the reinforcement are degraded with time by thermochemical and/or thermo-oxidative aging, with the consequence of a smaller resistance to mechanical aggressions.

To eliminate, or at least to reduce to the maximum, the risks of breakage of elastomeric mixtures for internal filling, that is, deprived of reinforcements, it is thus desirable that the mixtures possess a high mechanical cohesion at the operating temperature of the tire, but as low as possible hysteresis loss characteristics.

Those skilled in the art, confronted with the problem of compromise between minimum heating and high cohesion at high temperature, have proposed numerous solutions. It has thus been proposed to use elastomeric compositions for internal filling, that is, cushion mixtures, with relatively low hysteresis, in the form of:

- i. Compositions based on pure natural rubber or blended with polybutadiene, the reinforcing charge being a carbon black with a specific surface preferably lower than $110 \text{ m}^2/\text{g}$ and used in a proportion of 30-35 pce (parts by weight per 100 parts of elastomer),
- ii. Compositions based on pure natural rubber or blended with polybutadiene, reinforced by admixture of carbon black and silica, the usual proportions of carbon black being 30-35 pce and those of silica, 10-15 pce,
- iii. Compositions based on diene rubber and 1.2-syndiotactic polybutadiene as described in the patent application JP-A-94/092108,
- iv. Compositions based on natural rubber, possibly blended with another diene elastomer, comprising carbon black and thermoplastic polymer fibers as described in the patent application JP-A-95/330960.

The Applicant has discovered that it is possible to obtain an improved compromise between heating and cohesion and excellent resistance to mechanical stresses with high imposed deformations, by the use of an elastomeric composition with internal filling:

- i. based on natural rubber, pure or blended with at least one other diene elastomer;
- ii. reinforced with:
 - either a charge of carbon black used in a proportion comprised between 15 pce and 28 pce, and preferably between 20 and 25 pce,
 - or a clear charge chosen from among precipitated or pyrogenic silica comprising surface SiOH groups, precipitated aluminas comprising surface AlOH groups, a natural or precipitated aluminosilicate comprising both SiOH and AlOH groups on the surface, the said clear charge being used in a proportion of 15-40 pce and preferably 20-35 pce,
 - or with a blend of carbon black and clear charge as previously described, such that the overall proportion of charge is ≥ 15 pce and ≤ 50 pce, and that the proportion of clear charge is greater than or equal to that of carbon black in pce minus 5 pce.

In the case of using a clear charge, it is necessary to use a coupling and/or coating agent chosen from among the agents known to one skilled in the art. As examples of preferred coupling agents, there can be cited the sulfided alkoxysilanes of the type of bis-(3-trialkoxysilylpropyl) polysulfide, and among these particularly, bis-(3-trialkoxysilylpropyl) tetrasulfide, sold by the DEGUSSA company under the designations Si69 for the liquid product and X50S for the solid product (blending 50/50 by weight with black N330). As examples of coating agents, there can be cited a fatty alcohol, an alkyl alkoxysilane such as a hexadecyltrimethoxysilane or a triethoxysilane, respectively sold by the DEGUSSA company under the designations Si116 and Si216, diphenylguanidine, a polyethylene glycol, a silicone oil which may be modified by OH or alkoxy functions grafted at the end of, or onto, the chain. The coating or coupling agent is used in a weight proportion, with respect to the clear charge, $\geq 1/100$ and $\leq 20/100$, and preferably comprised between 2/100 and 15/100.

The elastomeric internal filling compositions or cushion mixtures according to the invention are for example profiles of triangular shape separating the carcass ply from the radially internal apex sheet, profiles situated between apex carcass plies over the whole of their width, and/or profiles separating the ends of apex sheets constituting the apex ply, profiles situated axially outside the turn-up of the carcass profile, profiles reinforcing the beads of the tire disposed between the carcass ply turn-up and the bead reinforcement profile disposed radially above the bead core and adjacent to the said bead core and/or axially outside the turn-up of the carcass ply.

Among the diene elastomers which can be used in blends with natural rubber, there may be mentioned synthetic polyisoprene (PI), a polybutadiene (BR), preferably with a majority of cis-1.4 chains, a solution or emulsion of styrene-butadiene (SBR) copolymer, preferably with a majority of trans-1.4-chains, a butadiene-isoprene copolymer (BIR), or else furthermore a styrene-butadiene-isoprene terpolymer (SBIR). These elastomers can be modified during preparation, or after preparation by means of branching agents such as a divinylbenzene, or crosslinking agents such as carbonates, tin halides, silicon halides, or also functionalization agents leading to grafting, onto the chain or at the chain end, of oxygenated, carbonyl, carboxyl, or else an amine function such as for example by action of dimethyl or of diethylamino benzophenone. In the case of blending natural rubber with one or more of the abovementioned diene elastomers, the natural rubber is preferably used in a major proportion, and more preferably in a proportion greater than 70 pce.

When carbon black is used as the sole reinforcing charge, the required properties are obtained using a carbon black, or a blend of carbon blacks, the BET surface fineness of which is comprised between 30 and 160 m²/g, preferably between 90 and 150 m²/g and the DBP structure

of which is comprised between 80 and 160 m²/g, preferably between 90 and 150 m²/g. The proportion of carbon black used is preferably comprised in the bracket of values 20 pce and 25 pce. The BET specific surface measurement is performed according to the method of Brunauer, Emmet and Teller described in the "Journal of the American Chemical Society," vol. 60, page 309. February 1938, corresponding to the standard NFT 45007 of November 1987.

When a clear charge is used as the sole reinforcing charge, the hysteresis and cohesion properties are obtained using a precipitated or pyrogenic silica, or else a precipitated alumina or else again an aluminosilicate of BET specific surface comprised between 30 and 260 m²/g. A proportion of charge is preferably used of from 25 to 35 pce. As non-limitative examples of this type of charge, there may be mentioned silicas KS404 of the Akzo company, Ultrasil VN2 or VN3 and BV3370GR of the Degussa company, Zeopol 8745 of the Huber company, Zeosil 175MP or Zeosil 1165 MP of the Rhodia company, HI-SIL 2000 of the PPG company, etc.

In the case of blending carbon black with a clear charge, a proportion of the clear charge of from 30 to 40 pce is preferably used.

As other examples of reinforcing charges having the morphology and surface functions of SiOH and/or AlOH of the previously described materials of the silica and/or alumina type, being usable according to the invention as a partial or total replacement of the latter, there may be mentioned modified carbon blacks which are modified either during synthesis by the addition of a silicon and/or aluminum compound to the furnace feed oil, or after synthesis by adding an acid to an aqueous suspension of carbon black in a solution of sodium silicate and/or aluminate, so as to at least partially cover the surface of the carbon black with SiOH and/or AlOH functional groups. As in the case of the preceding clear charges, the specific surface of the charge is comprised between 30 and 260 m²/g, and the overall proportion of silica and/or alumina type charge is greater than or equal to 15 pce, preferably greater than 25 pce, and less than or equal to 35 pce. As non-limitative examples of this type of carbonaceous charge with SiOH and/or AlOH functional groups on the surface, the CSDP (carbon silica dual phase) type charges may be mentioned, as well as those of the patent application EP-A-0 799 854.

As other charges which may be used to obtain the diene compositions for internal filling having the properties of reinforcement and hysteresis according to the invention, blends can be used of one or more carbon black with in one or more other charges already mentioned, having SiOH and/or AlOH functional groups on the surface, the overall proportion of charge being comprised between 15 and 50 pce, preferably comprised between 20 and 45 pce, and the proportion of charge with the surface functional groups SiOH and/or AlOH being greater than or equal to the proportion of carbon black minus five.

Finally, with the purpose of improving usability and/or to reduce the cost of the compositions according to the invention, without the hysteresis and cohesion characteristics being fundamentally modified, the previously described charge or charge blends can in part be replaced by a less reinforcing charge, such as a milled or precipitated calcium carbonate or a kaolin, etc., under the condition of replacing x pce of reinforcing charge with $x + 5$ parts of less reinforcing charge, x being less than 15 pce.

The compositions according to the invention can crosslink under the action of sulfur, of peroxides or bismaleimides with or without sulfur. They can likewise contain other constituents usually used in rubber mixtures, such as plasticizers, pigments, antioxidants, and crosslinking accelerators such as benzothiazole derivatives and diphenylguanidine.

The compositions according to the invention can be prepared by the known methods of thermomechanical working of the constituents in one or more steps. They can be obtained, for example, by thermomechanical working in one step in an internal mixer for 3-7 minutes at a rotation speed of the blades of 50 rpm, or in two steps in an internal mixer respectively lasting 3-5 minutes and 2-4 minutes, followed by a finishing step performed at about 80°C in which the sulfur and the vulcanization accelerators are incorporated, in the case of a sulfur-crosslinked composition.

The invention is illustrated by the following examples and which constitute no limitation of the scope of the invention.

In all the examples, unless otherwise stated, the compositions are given in parts by weight.

In these examples, which may be according to the invention or not according to the invention, the properties of the compositions are evaluated as follows:

Mooney viscosity:

Mooney ML (1 + 4) viscosity is measured according to ASTM D-1646.

Rheometry:

Rheometry measurements are performed by measuring the couple on a Monsanto model 100S rheometer. They are intended to follow the process of vulcanization by determining the time T_0 in minutes which corresponds to the delay of vulcanization and the time T_{99} which corresponds to 99% of the maximum measured couple.

Extension modulus:

Modulus of extension to 100% (MA100) and 300% (MA 300) are measured according to the standards ISO37-1977.

Scott breakage index:

These indices are measured at 23°C or 100°C. The stress on breakage (FR) in Mpa is determined, and the extension at breakage (AR) in %.

Tearability Index:

These indices are measured at 100°C. The force (FRD) in Mpa and the extension at break (ARD) in % are determined on a test sample of dimensions 10 x 105 x 2.5 mm, notched to a depth of 5 mm at the center of the length.

Hysteresis losses (PH):

The hysteresis losses (PH), or hysteresis, are measured by rebound at 60°C according to the standard ISO R17667 and are expressed in %.

Torn surface in cm² after impact of a tire against a sidewalk:

The tire to be tested is first stoved at 77°C for 6 weeks in a ventilated stove so as to simulate aging by rolling.

A heavy vehicle equipped with the tire to be tested enters a sidewalk at a very low speed (20 km/h) at a fixed angle less than 20 degrees. Five passes onto the sidewalk are performed, after which the tire is removed and then stripped down, and the torn surfaces due to the five impacts are measured and averaged.

In all the trials, the compositions according to the invention are used in the form of triangular profiles disposed between the carcass ply and the radially interior apex sheet.

Example 1

The purpose of this example is to compare compositions based on natural rubber reinforced with carbon black. These compositions are given in Table 1. They put to use, in the case of Trial 1, a composition according to the invention with a low proportion of Black N115; in the case of composition 2, a composition according to the invention with a low proportion of Black N326. The compositions used in Trials 3 and 4 are control compositions representing the

known art. The composition of Trial 3 has a proportion of 35 pce of Black N330, and that of Trial 4 comprises a proportion of 50 pce of Black N347. All the compositions can be vulcanized with sulfur.

The characteristics of the constituents are as follows:

- Peptized natural rubber, Mooney ML (1+4) at 100°C equal to 60
- Antioxidant: N-(1,3-dimethyl)butyl-N'-phenyl-p-phenylenediamine
- Soluble sulfur
- Vulcanization accelerator agents

The compositions of Trials 1-4 were obtained using all the ingredients except for sulfur and accelerators, by thermomechanical working in one step in an internal mixer for about 4 minutes at a speed of rotation of the blades of 50 rpm until reaching a temperature of 170°C, followed by a finishing step performed at 80°C, during which the sulfur and the vulcanization accelerators are incorporated.

Table 1

Composition	Trial 1 Example	Trial 2 Example	Trial 3 Control	Trial 4 Control
Natural rubber	100	100	100	100
Black N115	25	-	-	-
Black N326	-	25	-	-
Black N330	-	-	35	-
Black N347	-	-	-	50
ZnO	5	5	2.10	7
Stearic acid	0.5	0.50	1.40	2
Antioxidant	1.50	1.50	0.70	1.50
Sulfur	1.60	1.60	1.75	2.50
Accelerators	0.54	0.69	1.00	0.85

Vulcanization is performed at 140°C for sufficient time to reach 99% of the maximum couple on the rheometer.

The properties of the four compositions are compared together. The results are shown in Table 2.

It is seen that for the control compositions 3 and 4, the torn surfaces during impact against the sidewalk are much greater than those obtained for the compositions 1 and 2 according to the invention. It is likewise seen that the extension to break at 100°C in the tearability test is much higher for the compositions according to the invention.

Table 2

	Trial 1 N115	Trial 2 N326	Trial 3 N330	Trial 4 N347
MA100	1.0	1.0	1.7	3.2
PH	13	10.5	12	18
Breakage index at 100°C AR%	780	740	630	490
Tearability index at 100°C ARD%	400	180	80	85
Torn surface	9	32	87	103

Example 2

This example has the purpose of comparing natural rubber compositions reinforced with silica as major charge with respect to control compositions based on a major proportion of carbon black. These compositions are given in Table 3. They use, in the case of Trial 5, a composition based on a major proportion of silica and carbon black with the coating agent Si116 for the silica; for Trial 6, a composition of a major proportion of silica and carbon black, and as coating agent for the silica, polydimethylsiloxane of molecular weight around 400 (PDMS); in the case of Trial 7, a composition of major carbon black and of silica bonded to the elastomer by the bonding agent X50S from Degussa, and in the case of Trial 3 a composition based on N330. Trials 7 and 3 are representative of known compositions as references. All these compositions can be vulcanized with sulfur.

Table 3

Composition -----	Trial 5 Example	Trial 6 Example	Trial 7 Control	Trial 3 Control
Natural rubber	100	100	100	100
UVN3	35	35	15	-
Black N330	5	5	-	35
Black N347	-	-	40	-
X50S	-	-	3	-
Si116	5.00	-	-	-
PDMS	-	2.00	-	-
ZnO	7.00	7.00	7.00	2.10
Stearic acid	1.00	1.00	2.00	1.40
Antioxidant	1.50	1.50	1.50	0.70
Sulfur	1.75	1.75	1.80	1.75
Accelerators	1.50	1.51	1.25	1.00

The compositions and vulcanizations of Trials 5-7 and 3 are obtained in the same conditions as in Example 1.

The results of these four compositions are compared together. The results are shown in Table 4.

Table 4

Composition -----	Trial 5 Example	Trial 6 Example	Trial 7 Control	Trial 3 Control
Natural rubber	100	100	100	100
UVN3	35	35	15	-
Black N330	5	5	-	35
Black N347	-	-	40	-
X50S	-	-	3	-
Si116	5.00	-	-	-
PDMS	-	2.00	-	-
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MA100	1.0	1.2	2.9	1.7
PH	13.5	15	18	12
Breakage index at 100°C AR%	800	780	490	630
Tearability index at 100°C ARD%	510	500	230	80
				87
Torn surface	8	13	83	

It can be seen that for the control compositions 7 and 3, the torn surfaces during impact against the sidewalk are much greater than those obtained for the compositions 5 and 6 according to the invention. As in the preceding example, it is seen that the extension to break at 100°C in the tearability test is much lower for the control compositions.

Example 3

This example has the purpose of comparing the compositions reinforced with silica as major charge while varying the nature of the bonding agents and coating agents, the vulcanization system being adjusted so that the 100% elongation moduli are quite close for drawing reliable conclusions about the effects of the parameters studied. The compositions according to the invention are given in Table 5. In the case of trials 8, 9 and 10, they use compositions having as single silica charge in a proportion of 30 pce having respectively a coupling agent X50S, a coating agent of polyethylene glycol of average molecular weight

Table 5

-----Composition----	Trial 8	Trial 9	Trial 10	Trial 11	Trial 12	Trial 13	Trial 14	Trial 15
Natural rubber	100	100	100	100	100	100	100	100
UVN3	30	30	30	25	30	35	30	35
N330	-	-	-	5	5	5	5	5

ZnO	7	7	7	7	7	7	7	7
Stearic acid	1	1	1	1	1	1	1	1
Antioxidant	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
X50S	7	-	-	-	-	-	-	-
PEG4000	-	4.3	-	-	-	-	4.3	5
PDMS	-	-	1.7	1.4	1.7	2.0	-	0
Sulfur	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Accelerators	1.51	2.00	1.51	1.51	1.51	1.51	2.00	2.00

4,000, and another coating agent, polydimethylsiloxane. In the case of Trials 11-15, the reinforcing charge is constituted by a blend of silica and 5 pce of N330.

The compositions and the vulcanization of Trials 8-15 are obtained in the same conditions as in example 1.

The properties of these eight compositions are compared together. The results are shown in Table 6.

Table 6

Composition	Trial 8	Trial 9	Trial 10	Trial 11	Trial 12	Trial 13	Trial 14	Trial 15
MA100	1.27	1.16	0.93	0.96	1.00	0.98	1.25	1.37
PH 60°	9.4	9.6	11.7	11.4	12.7	15.6	11.3	13
AR (100°C)	733	770	855	813	856	867	762	736
ARD (100°C)	590	371	793	538	726	685	277	307
FRD (100°C)	84	38	60	51	67	62	38	38

For Trials 8, 9 and 10, it is seen that with a constant silica charge according to the invention, the coupling agent X50S gives surprising results for tearability, bracketed by those obtained by the coating agent PEG4000 and the coating agent PDMS.

For Trials 11, 12 and 13, in the presence of the coating agent PDMS, with a proportion of black of 5 pce and a proportion of silica increasing from 23 to 35 pce, the best results for tearability are obtained with the intermediate proportion of silica of 30 pce.

Comparing the results of Trials 10 and 12 on the one hand and Trials 9 and 14 on the other hand, it is noticeable that 5 pce of carbon black added to 30 parts of silica do not fundamentally change the tearability results in the presence of the coating agents PDMS or PEG4000.

Comparison of the results of Trials 14 and 15 shows that passing from 30 to 35 pce of silica in the presence of 5 pce of carbon slightly improves the results when the coating agent

PEG4000 is used, while the inverse effect is observed with the coating agent PDMS (Trials 12 and 13)

Summing up, the use of the compositions of the invention, either with the carbon black reinforcing charge used in a proportion around 25 pce, or with a white charge of the silica and/or alumina type used alone or at a major proportion of about 35 pce independently of the fact that a coupling or coating agent is used, enables it to be shown that, with respect to compositions such as based on carbon black used alone or as major charge, the effects of mechanical aggressions of the type of imposed deformations are less deleterious and permit increasing the life of the tire, and in addition that the described compositions are of low hysteresis, with the consequence of lower internal heating of the tire during rolling and a reduced thermal and/or thermo-oxidative degradation of the ply of the carcass. These good properties are likewise verified with a tire in which the internal filling profile is used in the lower zone of the tire between the carcass plies and the bead reinforcing profile disposed above, and adjacent to, each of the bead cores.

The invention is of course not limited to the previously described embodiment examples, starting from which other embodiments can be envisaged.

CLAIMS

1. Use as elastomeric mixtures for internal filling of tires of compositions based on natural rubber and possibly at least one other diene elastomer, the natural rubber being present in case of blending in a major proportion with respect to the proportion of other elastomer(s) used, and of a reinforcing charge constituted:
 - (i) either by a carbon black of BET specific surface comprised between 30 and 160 m²/g, and preferably between 90 and 150 m²/g, used in a proportion equal to or greater than 15 pce and less than or equal to 28 pce,
 - (ii) or by a white charge of the silica and/or alumina type comprising SiOH and/or AlOH surface functional groups, chosen from the group comprising precipitated or pyrogenic silicas, aluminas, or aluminosilicates, of BET specific surface comprised between 30 and 260 m²/g, used in a proportion greater than or equal to 15 pce and less than or equal to 40 pce.
 - (iii) or by a blend of carbon black described in (i) and a white charge described in (ii), in which the overall proportion of charge is greater than or equal to 15 pce and less than or equal to 50 pce and the proportion in pce of white charge is greater than or equal to the proportion of carbon black in pce minus five.
2. Use according to claim 1 of compositions preferably comprising, as reinforcing charge:
 - (i) a proportion of 20-25 pce of carbon black when the black constitutes the sole charge,
 - (ii) a proportion of 20-35 pce of white charge when this constitutes the sole charge,
3. Use according to any one of claims 1 and 2 of compositions in which the other diene elastomer(s) used by blending with natural rubber is/are chosen from among a synthetic polyisoprene with a majority of cis-1,4 chains, a polybutadiene with a majority of cis-1,4

chains, a butadiene-styrene copolymer, preferably with a majority of trans-1,4 chains, a butadiene-isoprene copolymer, a styrene-butadiene-isoprene terpolymer, diene elastomer able to be modified during synthesis for synthetic elastomers or after synthesis by grafting – at chain end or on the chain, of functional groups active with charges of the carbon black type or having SiOH or AlOH surface functional groups – and/or crosslinking agents such as carbonyls or silicon or tin halides.

4. Use according to any one of claims 1-3 as profiles situated in the apex zone of the tire between the carcass ply and the apex sheets and/or between the apex sheets either over the whole of their width or between the ends of one or more of the said apex sheets and/or in the bead of the tire between the turn-up of the edging carcass ply and the reinforcing profile disposed above the bead core and/or axially outside the turn-up of the carcass ply.
5. Use according to any one of claims 1-4 of compositions having a ratio by weight of coupling and/or coating agent to white charge greater than 1/100 and less than 20/100, preferably comprised between 2/100 and 15/100.